MARYLAND FISHERIES

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THE SEA NETTLE OF THE CHESAPEAKE

By E. J. PAPENFUS, the Zoological Laboratory,
the Johns Hopkins University.

AN INVESTIGATION was started last summer concerning the life history of the common sea nettle of the Chesapeake. The work was carried on at the Chesapeake Biological Laboratory of the Conservation Department at Solomons Island, Maryland. The problem was suggested by Dr. R V. Truitt, director of the laboratory, to whom the writer wishes to express her gratitude for his cooperation and aid. The work was assisted by a grant from the University of Maryland.

There are two varieties of summer nettles in the bay: the red and the white. The scientific name of the red nettle is *Dactylometra quinquecirrha*. There has long been a difference of opinion among scientists as to whether the red and the white nettle are the same or different species. From data obtained last summer it is practically certain that they belong to the same species.

Although the sea nettle is not as highly specialized as the crab and oyster it does have a mouth, stomach, sex organs. sense organs and the like. Figure 1 shows the main structure of the adult nettle. The large, round bell (b), composing the main body of the nettle, is mostly a stomach cavity. The mouth (m) is in the center of the bell on the under side and the long streamers which float behind the nettle are the lips of the mouth (1). The sex organs (g) (or gonad tissue) are four large structures which can be seen through the top of the bell. The minute sense organs (s) which probably receive vibrations, are eight in number, are white, and are spaced at regular intervals around the edge of the bell. Long string-like structures, or tentacles (t) which carry the stinging cells, hang down from the edge of the bell. There are three or five tentacles between each sense organ.

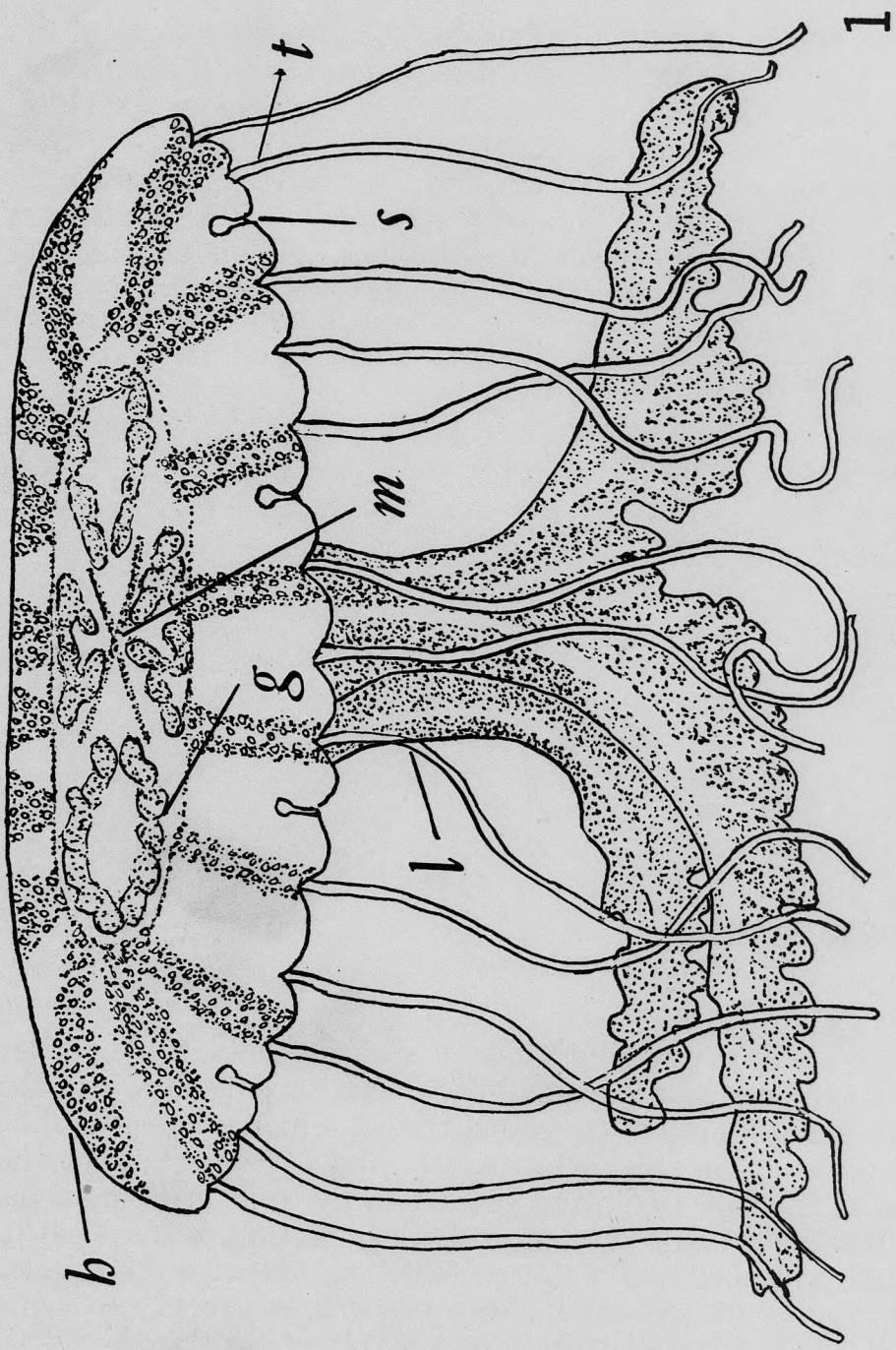
Part of the work last summer was a study of the early development of the nettle. It would be of interest to know the localities in the bay in which young nettles develop but before this could be ascertained it was necessary to be able to identify a young nettle from the countless other organisms in the bay. Thus it was necessary to raise sea nettles from the eggs. This had never before been accomplished and many different methods were tried before we met with success. All the breeding experiments were on the white nettle.

The first step was to learn how to distinguish a male from a female nettle. Fortunately it was found that the male tissue which carries the sperms is pink and the female tissue which carries the eggs is a grayish brown. Male and female jellyfish were collected, brought back to the laboratory, and the egg and sperm tissue removed and placed in sea water in small dishes. When this is done the eggs are fertilized by the sperm. The eggs are shed only at night.

After fertilization the egg undergoes many different changes in shape and finally develops into a minute microscopic organism which is attached at one end and has a mouth (m) at the other end (figure 2). When the young nettle is about two weeks old it has four tentacles (t) by means of which it catches smaller organisms for food.

The young nettle grows in size and the tentacles increase in number. These specimens were kept alive in the laboratory by feeding them minute organisms obtained by towing with a silk net.

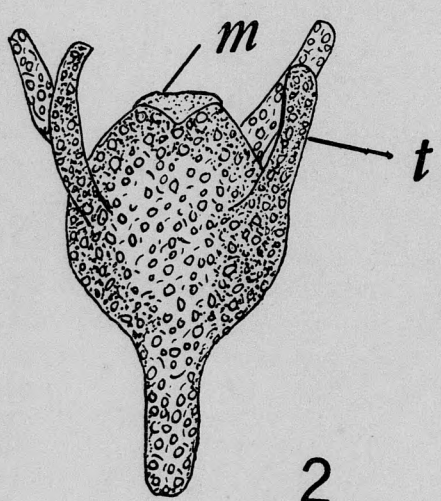
The sea nettle is a friend to the oyster for it eats an enemy



ADULT NETTLE

of the young oyster, the Ctenophore. Thus it is evident that nettles are of some economic importance although they are a nuisance to bathers. Our young nettles furthermore do not eat crab larvae.

We were able to study in detail the stinging structures of the nettle. There are hundreds of these structures on the tentacles, so minute that they can be seen only when magnified several hundred times. The stinging cell, or nematocyst, is a capsule filled with a poisonous fluid. The capsule (figure 3) contains a long coiled thread which is suddenly everted when the nettle is touched. The thread carries the poisonous fluid on it. In nature this fluid paralyzes the prey of the nettle, so that the prey can easily be captured.



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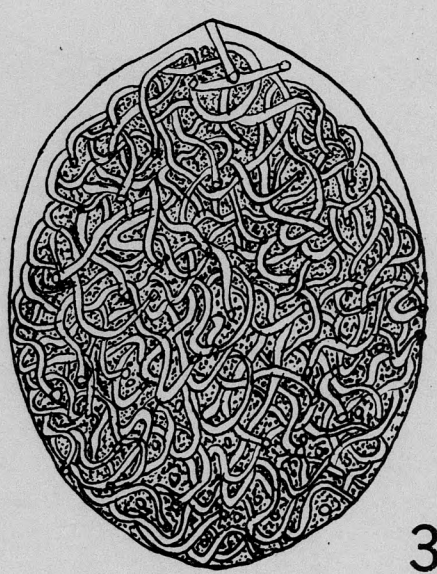
YOUNG NETTLE



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STINGING CELL

There are four different kinds of stinging cells in the nettle: three large ones and one small one. The capsule shown in the picture has a long greatly coiled thread which completely fills the capsule. The thickness, length, and arrangement of the thread in the capsule differs greatly in the four stinging cells. The stinging cells of the red and white nettle are identical in size and structure and it is this fact, coupled with other data, which makes us believe that the two forms are of the same species. In the fresh water hydra, a relative of the sea nettle, the stinging cells are the basis of classification and it is suggested that the stinging cells may, in the future, form the basis of classification of the Scyphozoa (the class to which the sea nettle belongs).

OYSTER GROWERS AND COMMISSIONERS TO MEET IN BALTIMORE

WHAT is planned to be the largest gathering of members of the Oyster Industry ever held will take place in Baltimore August 6, 7, 8, 9, next, when the joint Convention of the Oyster Industry, the Blue Crab Industry and the association of Shell Fish Commissioners meet to discuss problems peculiar to each organization. It is expected that approximately 500 persons will attend the joint session and the separate group meetings during the four days. Laymen prominent in the Seafood Industry, together with scientists engaged in research work detail the results of their investigation. Other men prominent in the industries will discuss business questions of interest. It is also planned to have officials of NRA present to answer questions regarding the operations of the Codes of Fair Competition for the Oyster Industry and the Blue Crab Industry.

It is also planned to submit to the Convention a program for a national advertising campaign which has for its object the doubling of the consumption of oysters. Material for the campaign has already been submitted to an advertising expert who is working on an estimate of costs and is preparing an outline of advertising activities. Howard W. Beach, of New Haven, is president of the Oyster Growers and Dealers Association of North America, which is sponsoring the Convention, and Dr. R. V. Truitt, of the Maryland State College is head of the Association of Shell Fish Commissioners.

FREDERICK COUNTY TROUT STREAMS

(A RAMBLING DISCOURSE)

By H. B. MACCUBBIN

COMPLETELY SURROUNDED by majestic mountainsides, the clear, cold water gurgled, bubbled and bounded over rocks, here stealing a seeming rest in the swirls of a more level pool, there dropping with a roar between giant rocks—a gorgeous eight-foot waterfall; boiling, rushing, surging in white turmoil with subsequent backwash, whirlpools and eddies.

In the foreground an angler from Pennsylvania, using the latest and lightest flyrod, soft enamel tapered line, a six-foot

leader and a brown hackle-wet fly with spinner stands slowly and methodically "working" a riffle.

Twenty yards upstream a native boy in blue denim overalls, his bare feet incased in oversize workshoes, sits on a boulder, his branch rod held lazily while the swirling water below him moves a hookful of worms all over the poolbottom.

From around a bend, appear two more anglers, hurriedly drifting a worm in every spot likely to hide a trout. And, before your eyes leave the upstream bend, a sound of boot-an'-rock announces an angler immediately behind.

There were thirty cars parked along the road as we drove up we hear the hum of additional motors as we fish.

Frederick County trout streams! Perfection as far as trout, water and surroundings are concerned, but such ramifications to disturb the Conservation Department!

Those gorgeous, tumbling, ever-cold mountain streams, literally filled with hiding, feeding or resting places for trout; tens of thousands of healthy adult trout placed systematically and carefully therein by qualified fish culturists and still the ever increasing cry from many sources—"No fish!"

Why?

First—Anglers cannot expect to follow each other, thirty feet apart and hope to catch a creel limit in one or even two days.

Second—Ninety per cent of the anglers visiting this section use worms exclusively.

Third—The average angler lacks the patience to "stay with" a likely spot of water a half hour or longer.

Fourth—Trout have their feeding times, even as you and I.

So what?

First—Take a likely stretch of water or a "hole" and *stay with it.* Every angler who has the least idea of sportsmanship or the ethics of fishing will give you a wide berth and in fifteen or twenty minutes, the disturbed trout will be venturing from their safe retreats.

Second—Try goldfish, a brown hackle-wet fly with spinner, a metal lure or imitation minnow. Change and vary the baits you present.

Third—If you believe "a trout should be thar' "—hold everything and cover every foot of that particular water from downstream, cross current and upstream. Use all the artificials you have. Still fish with live minnows, goldfish or worms. STAY WITH THAT SPOT FOR AN HOUR.

Fourth—Try twilight fishing, or if you know where a big one is lying—one that refuses to look at your lures or bait—visit him at daybreak, at noon and again at sundown. You may be rewarded.

The Conservation Department has no control over the number of fishermen who use the streams or how they use them, within the law. They propagate and stock—that's about all that can be expected of the department, unless they had the legal authority to open and close streams at will, then perhaps, natural propagation plus continued stocking would offer better results.

The real answer is not—"Not Enough Trout"—instead "Too Many Anglers!"

Hundreds of people go to these sections to enjoy the scenic beauty—thousands to FISH.

What to do about it is a real problem.

THE FEDERAL BLACK BASS LAW

By TALBOTT DENMEAD,
Enforcement Officer, U. S. Bureau of Fisheries

THE recently enacted Federal law regulating the interstate transportation of black bass is the result of a widespread demand for the further protection of one of America's greatest game fish. The need for this protection was brought about, at least partially, through the failure of some of the States to give adequate protection through their State laws.

The Federal Black Bass Law provides that no person shall deliver or receive for transportation, or transport by any means from any State or Territory, to or through any other State or Territory, any largemouth or smallmouth black bass if: (1) Such transportation is contrary to the laws of the State or Territory from which such fish is transported; or (2) which have been caught, killed, taken, sold, purchased, possessed or transported at any time contrary to the laws of the

State or Territory where caught, taken, sold, purchased, or possessed, or from which they were transported. Provision is made for interstate shipments of live fish and fish eggs for propagation and re-stocking. Persons receiving shipments of black bass are not required by law to keep books or records of shipments; but, if such records are kept, render themselves liable to prosecution if they make any false record or entry.

Briefly, the law prohibits the shipment of largemouth and smallmouth black bass from one State to another that have been taken, sold, or transported contrary to a State law. In other words, a violation of the Federal statute is predicated on a violation of some existing State law protecting black bass; and, in addition, there must be an interstate transportation before aid can be invoked under the Federal law. There is nothing in the law that prevents the States giving the black bass further protection if they so desire.

A very important feature of this law is the section which requires all interstate shipments of fish which contain bass, to be conspicuously marked "Black Bass," together with an accurate statement of the number of black bass contained and the names and addresses of both consignor and consignee. While this is of importance to all who handle black bass, it is of especial importance to those who ship from States where these game fish are given little or no protection by State law.

Black bass illegally transported in violation of the Federal law or any regulation promulgated by the Secretary of Commerce are subject to seizure by any authorized employee of the department or by the United States Marshals and Deputy Marshals. Fish so seized may be disposed of by order of a United States Court upon conviction of the offender; or, if in the judgment of the Court the bass were transported, delivered, sold, purchased, or received in violation of the law. Violators are liable to punishment by a fine not exceeding $200, or imprisonment for not more than three months, or both in the discretion of the Court.

This law applies to only largemouth and smallmouth black bass, which are fresh-water fish, and in no way affects the interstate shipment of any other game or non-game fish, such as the brook trout. The Bureau of Fisheries has received many inquiries concerning enforcement of the law where fish other than bass were involved. Shipments of the salt-water fish known as the black sea bass or "Black wills," which on account of their similarity in size to fresh-water black bass,

and the fact that they are often placed on menus as "black bass" instead of "black sea bass," have caused considerable confusion in several States recently. These fish are not afforded protection under the Federal Black Bass Law.

SPRING FOREST FIRES

The disastrous forest fires which frequently occur at this season of the year have been fewer than usual in the State during the present spring, owing to normal rainfall conditions which have prevailed in almost every section. In Garrett County, however, where the rainfall has been somewhat short, fires have been reported. A particularly serious fire broke out on May 2 on Meadow Mountain, in the Vicinity of Deep Creek Lake, when about 2,500 acres were burned over, according to the report of Lake Warden Elmer Haulenbeek. Men from the the nearby CCC camps assisted in putting out the fire which raced over the dry hillsides with incredible speed. Owing to the altitude, which in this particular region reaches over 3,000 feet above sea level, few of the trees were in leaf, which added to the fire hazard. One of the fire wardens stated that his look-out tower, which was completely surrounded by the flames, became so hot, it was impossible to touch any part of the framework. As there is a game refuge located on Meadow Mountain, undoubtedly some game was destroyed. Warden Haulenbeek reports that wild turkeys, which were nesting at the time, remained undisturbed on their nests, while the workers back-fired all around them.

SHELL PLANTING BEGINS

Shell planting operations for the spring season of 1934 are in progress, and the department is at present engaged in moving to Cedar Point, below the Patuxent, around 50,000 bushels of shells. The results from shell planting on Cedar Point thus far have been so successful that the department decided to make the largest single planting this year in this locality. Plantings generally will be made in proximity to the seed oyster plantings of this year, in order to get the benefit of spawning when it occurs. Approximately 800,000 bushels will be planted.

MARYLAND FISHERIES

PUBLISHED BIMONTHLY BY CONSERVATION DEPARTMENT,
SWEPSON EARLE, Commissioner.

No. 28 BALTIMORE, MARYLAND May, 1934

TROUT

The number of persons to whom April means the beginning of the trout fishing season grows yearly in Maryland. Licenses obtained prior to the opening of the season this year showed an increase of 1,124 residents and 38 non-residents over the total for the entire season last year. Trout streams throughout the entire western section of the State were thronged with fishermen on the opening day, and in spite of heavy rains which made the creeks and rivers wild and muddy, creel limits in record time were reported by many trout fishermen.

An increasing interest in the out-of-doors and the sports it offers seem to be a growing characteristic of the American people. At no time has this been more apparent than during the recent years of the depression. As an escape from the stress and strain of these difficult times nothing has proved so helpful as sports pursued in the open, and many have learned that a loss in wealth can be more than compensated for by an increase in health and the enjoyment of simple pleasures. Nature is the great healer, and to those who have learned this lesson, no problem seems so difficult after a turn about the golf course, a contemplative hour or two with a fishing rod, or even a brief walk through the nearest countryside.

CRAB OUTLOOK

A scarcity of crabs and resultant high prices have confronted the devotee of this seafood since the opening of the season May 1. This was anticipated in a measure because of the unusual severity of the past winter, when creeks and rivers throughout the Bay Country were deeply frozen during much of January and February, and crabs hibernating in these waters were winter-killed in many localities. Consequently the supply present, in our waters at the beginning of the season was greatly reduced.

Comforting news has been received from one of the Department's officers in the Potomac river, St. George's Island, where the crabs business is usually very active. This report states that the daily catches of crabs are increasing, particularly soft crabs, and that the size is unusually large for this period of the year.

Doubtless as the season advances the supply will increase, and by the first of July the production should be about normal.

A TWO-FOLD BENEFIT

Apart from the demonstrated benefit to the oysters removed from the congested bars of the upper Bay's so-called "seed area" to localities where the food and growing conditions are more favorable, the benefit to the watermen who participated in the spring transplantation work of the Conservation Department is not to be overlooked.

To these men, who do not usually engage in any work but dredging in winter and freighting grain, fruit and vegetables in summer, the spring season is nearly always a slack one. This year, owing to the ice conditions which prevailed in the Bay during nearly all of January and February and prevented them from working, the season has been a particularly difficult one, and therefore the Department's spring work was of very real assistance.

Thirty-six boats engaged in the seed oyster work this year, twenty-six dredge boats and ten run boats, and the number of men directly employed ranged between 120 and 150. These operations cost the State approximately $10,000, and added materially to the earnings of these watermen and their families in Dorchester, Somerset, Talbot and the other counties from which the boats hail. When the dredging season opens in November next, the spring work of the dredgers will again redound to their financial benefit in the greatly enhanced value of the transplanted oysters.

In addition to the State's work, 38,037 bushels of seed oysters were sold to planters of the State, for which the dredgers received $5,705.55, making a total of approximately $16,000 for a brief period of three weeks' work, a most welcome addition to the incomes of this class of watermen whose field of work has been somewhat curtailed since the closing of the Potomac River to dredging.

SEED AREA AND OTHER SPRING OYSTER REMOVAL OPERATIONS IN THE STATE

DURING the early part of October last year, a careful investigation was made of the dredging rocks of Chesapeake Bay, and the department at that time, realizing that the majority of the oysters on the bars above Sandy Point were too small for successful dredging operations, discouraged the watermen from working on these upper bay rocks as much as possible. In leaving undisturbed many of these oyster bars, the oysters thereon have been greatly benefited, and a recent investigation, made prior to the opening of the seed area at the head of the bay, showed that all of the bars lying south of Tolchester and Teatable had many marketable oysters, and all of the oysters had made greater growth than during any similar period in the memory of the department. The bars that were open produced clean seed, and in comparison with 1928 when the upper Bay area was open for extensive transplanting of seed oysters, it is found that twice the number of boats were engaged at that time and they covered all the bars above Sandy Point, and at the end of the operations the bars were worked down much closer than the few bars which were used this year.

This section of the Chesapeake offers a very fine prospect for dredging operations next fall. The department had anticipated that the very cold weather of the past winter would have caused great mortality at the head of the bay, but investigation showed that the oysters were in a healthy and flourishing condition, and the mortality was normal.

Operations at the head of the bay started on April 23 and ended May 10. A total of 38,037 bushels of seed oysters were caught and sold to lessees of oyster ground located in various parts of the State. There were 26 dredge boats and ten run boats engaged in the work, and a price of ten cents per bushel and five cents for freighting was received by the watermen, making a total cost to the lessee of 15 cents per bushel.

After the work of supplying lessees with seed was completed, the department engaged the dredge boats to catch 107,402 bushels for transplantation to better growing areas. The dredgers received five cents per bushel for catching the oysters. When they were freighted to the planting grounds by run boats, the cost was five cents per bushel; when by dredge

boats, three cents was paid. The entire operations netted the the dredger and run-boat captains approximately $16,000.

The oysters transplanted by the State were as follows:

Mud Rock, Tangier Sound	33,144	bushels
Diamonds, Choptank River	10,892	"
Fishing Bay, Dorchester County	1,624	"
Parker's Rock, Chesapeake Bay	53,292	"
Bodkin Hollow, Chesapeake Bay	8,450	"

The largest planting, 53,292 bushels, on Parker's Rock, off the mouth of Herring Bay, will make this one of the finest areas on the western side of the bay for dredgers when these oysters mature, as this rock offers excelling growing conditions.

The tonging areas in the waters of Talbot, Kent, Somerset and St. Mary's Counties, where oysters were found to be too thick for proper development, and were transplanted to other bottoms by the local watermen, will be greatly benefited by the work done this spring.

After a meeting with the Watermen's Protective Association at Tilghmans Island when the work was agreed upon, 4,755 bushels of oysters were removed from the shallow water bars of Bald Eagle at the mouth of Harris Creek (Talbot County) to the following areas:

Popular Island Narrows, east of Jefferson Island Creek	3,130	bushels
Middle Ground, Choptank River	1,625	"

In addition, 3,000 bushels were taken from shallow water inside or back of Royston's Island to the outer rock on the old scrapers' ground at Royston's Island.

The department paid five cents per bushel for the transplanting of these oysters. Shells were immediately planted from Tilghmans Island to replenish cultch.

In Kent County arrangements were made, after a meeting with the Watermen's Protective Association of that County, to plant 3,000 bushels of oysters from the deep water of Swan Point to the inside of this bar. Tongers of Kent County are to do the work, which will cost $300.

In St. Mary's County, Deputy Commander A. P. Cullison supervised the catching of 6,900 bushels of oysters from the upper and thickly covered bars of the St. Mary's River. These oysters, transplanted at a cost of $265, were placed as follows:

Langley Hollow	2,000	bushels
Chicken Cock Bar	2,000	"
Gum Bar	2,200	"
Box Oak Bar	700	"

In Somerset County, in the Pocomoke Sound region, oysters were removed and thinned from the area of Marumsco Bar near the Maryland-Virginia boundary line, and transplanted to Gunby's Bar which is farther removed from the line The quantity moved was 4,000 bushels, and the cost was $163.50. Work was done under the supervision of Engineer H. E. Collins.

The department was of the opinion that the oysters on Buoy Rock in Chester River should have been thinned in a similar manner, but the Watermen's Protective Associations of Kent and Queen Anne's Counties thought otherwise, contending that the oysters, though clustered now, would separate and fall apart if left alone. Consequently, no action was taken by the department. In all, 20,655 bushels of oysters were transplanted in the tonging areas throughout the State, and in each case the tongers' wishes were ascertained before any work was undertaken by the Conservation Department.

The growing interest and cooperation displayed by the tongers in this branch of conservation work is most gratifying. In addition to the replenishing of the depleted oyster bars with shells and seed oysters, and closing other areas where rest is deemed essential to the future welfare of the oyster bars, the work of cultivating, thinning and transplanting has long been advocated by the department, but until recent years such proposals have met with strong opposition from the watermen. However, the tide has now been definitely turned in favor of conservation measures, as the watermen themselves have observed the benefits derived from such measures, and the future of the industry is considerably brighter because of this changed attitude.

VALUE OF GOVERNMENT HATCHERY OUTPUT

The strictly game varieties of fish including approximately ten species propagated and distributed from the Bureau of Fisheries hatcheries have a definite market value because of the fact that they are produced and sold by commercical hatcheries. It is, therefore, possible to ascribe to this phase of the Bureau's activities a monetary value based upon the selling price if the output were obtained from commercial sources. Taking into consideration the greatly reduced quotations on fish and eggs derived from commercial hatcheries

and making all other allowances on the side of conservatism it is estimated that the value of game fish and eggs alone distributed by the Division of Fish Culture during the last fiscal year was in excess of $2,350,000. This is something over four times the amount allotted for the entire operating costs of the Division. It is well to keep these facts in mind in any discussion of the economic evaluation of Federal fish cultural activities. It really signifies that there has been supplied by the Bureau of Fisheries for stocking public waters, the waters of the national parks and national forests and other areas of the national domain, a stock of fish having a market value of approximately $1,800,000 in excess of the cost of producing not only these fish but the billions of commercial varieties which were distributed in addition to the game species. In other words, these species which support commercial fisheries and which numbered over 6 billion in the 1933 output are in the nature of a byproduct, the cost of which are carried by the indirect economic value of the game fish production. No definite estimate is available to show the actual economic value of the sport fisheries on a national scale. However, the Senate Committee on Conservation of Wild Life Resources in its report to the Seventy-first Congress estimated the value of the annual sales of fishing tackle alone as $25,000,000, and the total economic valuation of outdoor recreation, of which hunting and fishing are among the most important phases, as $650,000,000 annually. It is therefore not unreasonable to ascribe the indirect valuation of $2,350,000 to the millions of game fish distributed by the Bureau of Fisheries.

This information is submitted more particularly to the employees of the Bureau in order that they may realize that they are playing no insignificant role in contributing to the economic interests of the Nation.—From *Fisheries Service Bulletin.*

CRAB INDUSTRY CODE APPROVED

ON MAY 5th, General Johnson, the Administrator of the NRA, approved a code of fair competition for the blue crab industry. This code becomes effective on May 14th.

The entire blue crab industry should benefit from this code, as it relieves the crab meat packers of the burden of the labor wage provisions of the National Fisheries code. There has been eliminated the wasteful practice of shipping crab meat on

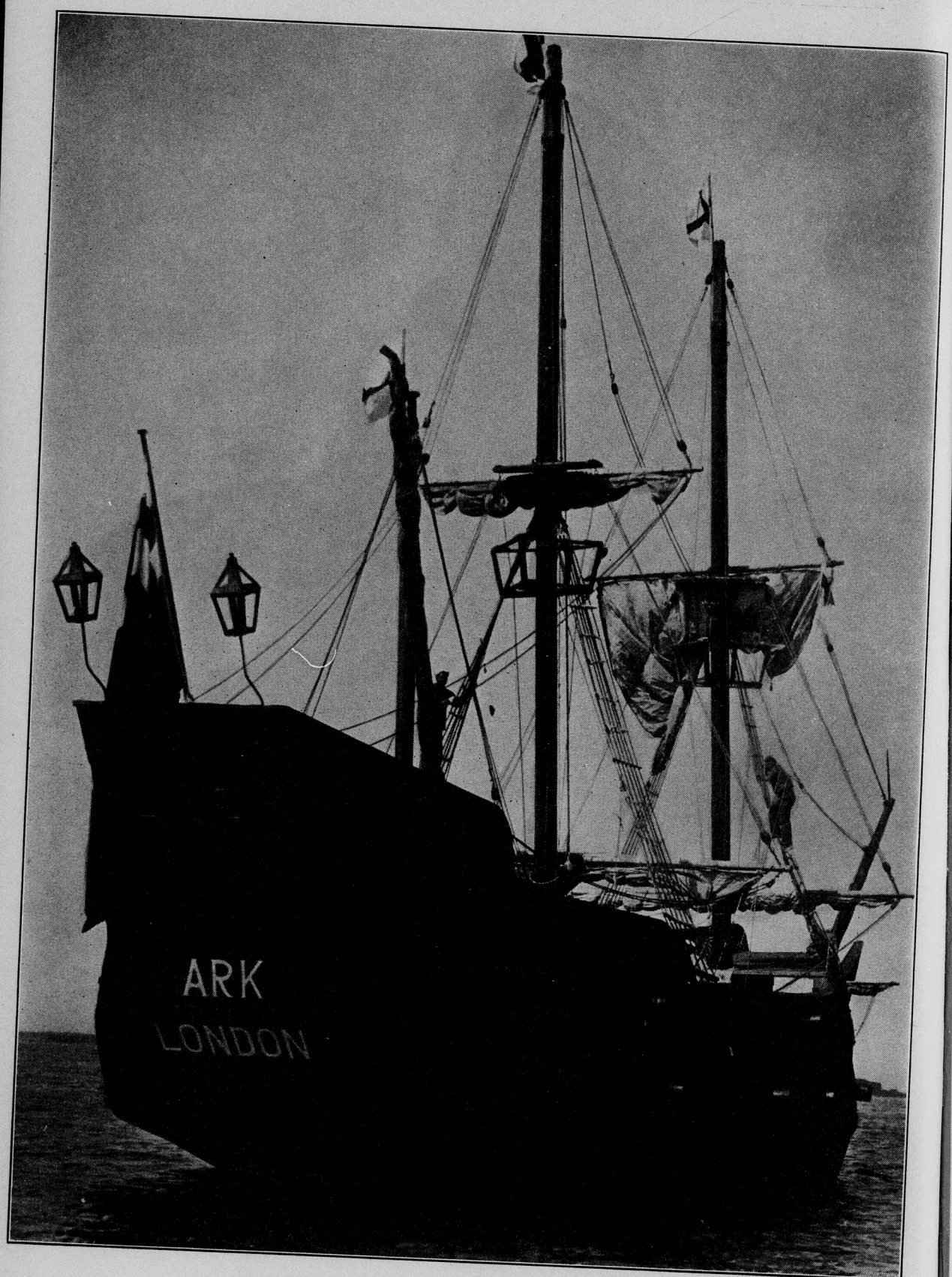
consignment. This practice has been a detriment to the industry for years and definite standards for the products of the industry have been established and thus the ground work laid for developing a profitable industry for the people along the Chesapeake Bay.

Certain conservation provisions are included in the code which, while not entirely agreeable to the industry at large, do strengthen and fortify the conservation laws of the states of Maryland and Virginia, which are the principal crab producing states. It is hoped that in the long run, the best interest of the industry will be served.

Many unfair trade practices are prohibited under the code, and practically all of them mean a saving to the members of the industry. It is of particular interest to see that an effort is being made to stabilize prices at a reasonable level and to stop destructive price cutting and sales below cost.

It is generally known that the seafood industry is one of the most unorganized and unregulated industries, but the potential possibilities through organized effort is unlimited, and this code which is of the first fruits of cooperative effort between the watermen and the packers of the Chesapeake region, should go far toward rehabilitating and making profitable the exploitation of one of our great natural resources.

Generally the members of the crab industry have written into Federal law proper rules for the regulation of their industry. They have made provision to govern their own affairs under the general supervision of the Government.



The Tercentenary Ark at St. Mary's City

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MARYLAND FISHERIES

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No. 29 BALTIMORE, MARYLAND July, 1934

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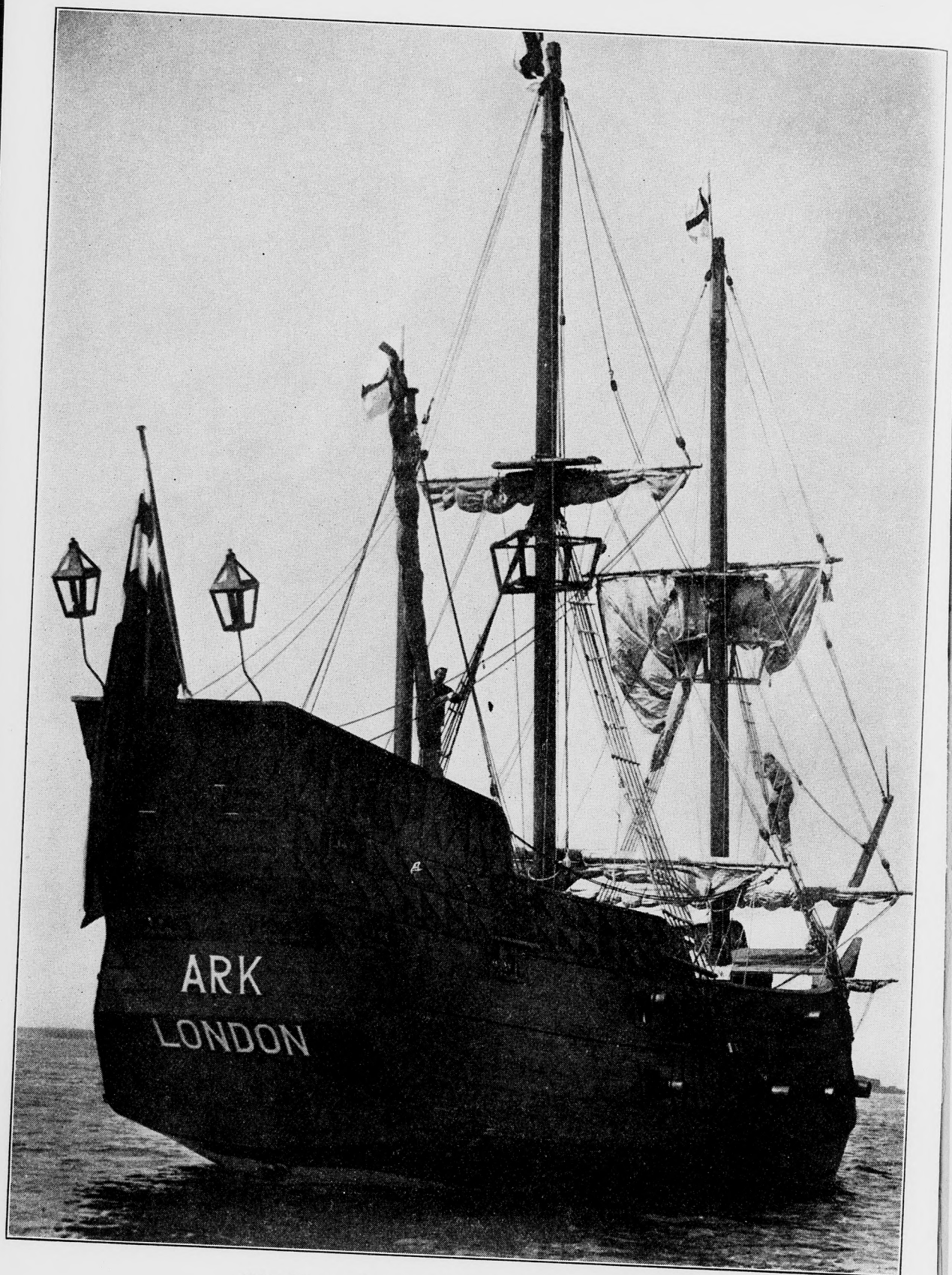
THE ARK AND THE DOVE OF 1934

ONE of the high points of the Tercentenary Celebration which took place at St. Mary's City on the St. Mary's River, June 15th and 16th, was the water pageant depicting the arrival of the Ark and the Dove and the landing of "Leonard Calvert and his fellow colonists" on the shores below the site of the first city of Maryland.

Those who witnessed the slow and stately progress of these two little ships on their way to the landing spot, a gentle southerly breeze filling the old square-cut sails, experienced a memorable thrill. Very little imagination was required to transplant oneself back into the seventeenth century and visualize the scene which took place on that spring morning three hundred years ago. The physical setting must have been much the same, the beautiful winding river, the meadows and trees lining the banks to the water's edge. The noisy motor boats clustering around the wharves, the American and British cruisers, and the swarming thousands along the river bank all faded out of the picture, and only the two little ships booming their salute to the King, the group of gallant men and women standing in the prow and on the



The Tercentenary Ark at St. Mary's City